Reduced fetal movements: time to move on?

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Reduced fetal movements: time to move on?

Every stillbirth is a tragedy; around half present with absent or reduced fetal movements (RFMs). This association inevitably leads to "what if" among parents and staff: could birth have been undertaken before stillbirth occurred? It also means that despite being a symptom, RFMs is 'associated with' stillbirth and indeed with its causes such as fetal growth restriction (FGR).

Fetal movement initiatives have become widespread. These encourage presentation, and the 'symptom' of RFMs has massively increased[1]. This is combined with management advice: In the UK, RFMs is a cornerstone of a stillbirth reduction strategy and now a major indication for induction of labour. A further particular concern is 'recurrent' episodes of RFMs.

Are these initiatives effective? Does the evidence support them? Why and when are movements reduced or perceived to be so? And could there be collateral damage?

Are RFM initiatives effective?

Randomised trials and 'impact' studies have assessed either self-monitoring or clinical advice for management of RFM, or both. The impact studies of combined packages of awareness and intervention are complex, but

benefits have been concluded. However, the most recent and therefore applicable, with 8821 women with RFMs, reported no reduction in perinatal mortality [1]. Indeed, excluding the pregnancies where RFMs was the presentation of stillbirth, they reported no increased risk of stillbirth with RFMs.

The interventions in recent trials, Saastad et al [2]and the Swedish Mindfulness trial [3] encouraged self-monitoring only. By contrast, both this and a clinical 'package' were implemented in the UK AFFIRM study [4] and the Australasian My Babies Movements [5], stepped wedge cluster randomised trials of over 400 000 and nearly 300 000 participants respectively. None of these trials reported reduced perinatal mortality. Systematic review and metanalysis[6] including smaller trials (but not the Australasian study), reported a possible reduction in stillbirth (RR 0.92; 0.85-1.00), but increased intervention rates. But any policy, which increases intervention to expedite birth at or near term should reduce perinatal mortality: routine induction of labour from 37 weeks does just that (RR 0.31; 0.15 -0.64).

Of course, these trials did not compare fetal movement monitoring with advice to ignore movements: 'usual care' increasingly constitutes a relatively high awareness of RFMs. But the evidence suggests that, barring when RFMs is the actual presentation of stillbirth, RFMs constitute a minor risk factor when compared, say, to other established risk factors such as reaching 42 or even 41 weeks.

Why and when do RFMs occur or are perceived to occur?

Clearly when stillbirth occurs, movements stop and this will usually, but not invariably, be perceived. Paradoxically, there may be a transient increase in movements. However, in the vast majority with RFMs, the movements pick up again and the pregnancy proceeds to term without adverse outcome [1,7].

Accepting that perceived and actual movements are different, there is little evidence on why reduced movements occur. Perception is altered by placental site, fetal position, fetal sleep and maternal activity. The data from biophysical profiles suggest a poor score is a late event. It is the largely undocumented but nevertheless clear experience of ultrasound that babies with severe FGR usually move normally and are perceived to do so. This, and the abrupt presentation of stillbirth with RFMs [8], suggests that where pathological it is a preterminal symptom. This is occasionally identified by a preterminal cardiotocograph. The implication is that the time window to expedite birth before disaster is short. Indeed, if RFMs do occur late in the sequence of different events that lead to stillbirth, fetal movements initiatives are akin to screening for ovarian cancer by looking for ascites.

Are recurrent episodes of RFM a real risk for stillbirth?

If 'pathological' RFMs is preterminal, it would seem unlikely that babies repeatedly become very sick and then recover. Indeed, not all evidence supports recurrent 'episodes' as a risk [7,9], and not all national (eg US) guidelines support the concept. Recently, in a retrospective study including >8000 pregnancies with RFMs, Turner et [1] reported that two or more episodes might increase stillbirth risk (aOR 4.96; 0.98-24.98) when compared to one episode, yet not when compared to no episodes. In a case control study of 660 stillbirths, Heazell et al [10] reported that women who had experienced stillbirth were more likely than controls to report multiple episodes of RFMs since 26 weeks (OR for three or more episodes 5.11 (3.22 to 8.10)). Ultrasound based studies show conflicting results but generally report a small excess of markers of FGR.

Do these establish recurrent RFMs as an independent risk factor? It constituted a cornerstone of the strategies of the trials that failed to reduce stillbirth. There is huge potential for reverse causality and bias. Women with high-risk pregnancies, or indeed abnormal scan findings, would be expected to be more vigilant, be scanned more often and have SGA babies more often. Women interviewed after a stillbirth may be affected by recall bias. Finally, what is the definition of 'recurrent'? No analyses differentiate between episodes of RFM and presentations of RFM. Why does this matter? Many clinicians will have seen pregnancies with RFMs and a normal CTG who, less than two days later and usually with continued RFMs, present with the baby in extremis or tragically dead. CTG changes are preterminal but the temporal relationship with RFMs is not consistent. Hence it is worth encouraging re-presentation and repeating the CTG if RFMs continue because the baby may be very sick but the CTG is not yet abnormal. This is not recurrent episodes of

RFMs: it is recurrent presentations of one episode.

Could fetal movement 'initiatives' cause harm?

Surprisingly, the incidence of RFM presentations is largely unreported[4,5]. Yet the 'performance' of a risk factor is related not just to sensitivity but to its specificity. In 2021 Turner[1] reported an increase in presentations from 4% of total births to 18% over a ten-year period in Australia. Bhatia et al in 2019 [7] reported a figure of 22.6% in the UK, with nearly half of women presenting more than once. Oxford data (unpublished) now suggest a figure of 40%. This massive increase almost makes RFMs a 'new normal'. The consequent 'emergency' assessment requires considerable resource: yet this and staff shortages are repeatedly cited as contributory to adverse outcomes. Intervention, induction and caesarean section, also increased [1,4,6], further contribute to this. In the UK, where an offer of induction from 39 weeks is mandated for recurrent episodes (with financial penalties), indications such as pre-eclampsia and postdates pregnancy with a better evidence base and probably greater individual risk, 'compete with' RFMs for induction on busy labour wards.

One common recommendation [4] is ultrasound. This can determine if movements are occurring and if these are perceived. Whilst identification of FGR may occur, an apparently normally grown baby may still be very unwell, from anaemia or even FGR. A false sense of reassurance could follow.

There are also direct consequences. Infant mortality[11], cerebral palsy and special educational needs are increased after even early term birth. The AFFIRM trial[4] recommended induction at 37 weeks in some circumstances and reported a possible increase in death up to one year and longer neonatal unit admission (aOR 1.12; 1.06-1.18). Maternal anxiety is not consistently reported in trials [4]. Although most studies report no worsening of psychological outcomes, it would be disingenuous to suggest that the high rate of presentation is not a manifestation of anxiety.

Conclusion

RFMs is the commonest presentation of stillbirth and a late manifestation of impending stillbirth. As such RFMs will be more common in at risk pregnancies. Occasionally, a very unwell baby can be 'saved' and so a small reduction in stillbirth could be expected if the symptom is reported, the fetal illness identified and then appropriately managed. This would usually be caesarean birth because of an abnormal antenatal CTG. However, presentation with RFMs, encouraged by awareness campaigns, is now so common that the absolute risk of pathology is far lower than it was: a risk factor with such a high incidence is of little use. Assessment and management of presenting women is causing risk and this itself could outweigh the potential benefits, perhaps even explaining the negative recent trial findings. As maternity services try to reduce stillbirth, both overall intervention and early term birth rates are increasing in many countries: the risks of these must be balanced against the risk of stillbirth. The evidence now suggests that RFMs is a minor, late-onset risk factor and its prioritisation could be causing harm.

In the UK, NICE summarised their 2021 evidence appraisal[12]: '*the committee... formed a recommendation raising awareness of the lack of evidence of effectiveness for such packages but not explicitly recommending against them.* ' Are clinicians and policy makers aware?

References

1. Turner JM, Flenady V, Ellwood D, Coory M, Kumar S. Evaluation of Pregnancy Outcomes Among Women With Decreased Fetal Movements. JAMA Netw Open. 2021 Apr 1;4(4):e215071. doi: 10.1001/jamanetworkopen.2021.5071. PMID: 33830228; PMCID: PMC8033440.

2. Saastad E, Winje BA, Stray Pedersen B, Frøen JF. Fetal movement counting improved identification of fetal growth restriction and perinatal outcomes–a multi-centre, randomized, controlled trial. PLoS One. 2011;6(12):e28482. doi: 10.1371/journal.pone.0028482. Epub 2011 Dec 21. PMID: 22205952; PMCID: PMC3244397.

3. Akselsson A, Lindgren H, Georgsson S, Pettersson K, Steineck G, Skokic V et al. Mindfetalness to increase women's awareness of fetal movements and pregnancy outcomes: a cluster-randomised controlled trial

including 39 865 women. BJOG. 2020 Jun;127(7):829-837. doi: 10.1111/1471-0528.16104. Epub 2020 Feb 8. PMID: 31971325.

4. Norman JE, Heazell AEP, Rodriguez A, Weir CJ, Stock SJE, Calderwood CJ et al. Awareness of fetal movements and care package to reduce fetal mortality (AFFIRM): a stepped wedge, cluster-randomised trial. Lancet. 2018 Nov 3;392(10158):1629-1638. doi: 10.1016/S0140-6736(18)31543-5. Epub 2018 Sep 27. Erratum in: Lancet. 2020 Oct 24;396(10259):1334. PMID: 30269876; PMCID: PMC6215771.

5. Flenady V, Gardener G, Ellwood D, Coory M, Weller M, Warrilow KA, et al. My Baby's Movements: a stepped-wedge cluster-randomised controlled trial of a fetal movement awareness intervention to reduce stillbirths. BJOG. 2022 Jan;129(1):29-41. doi: 10.1111/1471-0528.16944. Epub 2021 Oct 24. PMID: 34555257.

6. Bellussi F, Po' G, Livi A, Saccone G, De Vivo V, Oliver EA et al. Fetal Movement Counting and Perinatal Mortality: A Systematic Review and Meta-analysis. Obstet Gynecol. 2020 Feb;135(2):453-462. doi: 10.1097/AOG.0000000000003645. PMID: 31923063.

7. Bhatia M, Mitsi V, Court L, Thampi P, El-Nasharty M, Hesham S, et al. The outcomes of pregnancies with reduced fetal movements: A retrospective cohort study. Acta Obs Gynecol Scand. 2019;98:1450–4.

8 Linde A, Pettersson K, Rådestad I. Women's Experiences of Fetal Movements before the Confirmation of Fetal Death–Contractions Misinterpreted as Fetal Movement. Birth. 2015 Jun;42(2):189-94. doi: 10.1111/birt.12151. Epub 2015 Feb 23. PMID: 25703963.

9 Kapaya H, Almeida J, Karouni F, Anumba D. Management of reduced fetal movement: A comparative analysis of two audits at a tertiary care clinical service. Eur J Obstet Gynecol Reprod Biol [Internet]. 2020;248:128–32. Available from: https://doi.org/10.1016/j.ejogrb.2020.03.040

10. Heazell AEP, Budd J, Li M, Cronin R, Bradford B, McCowan LME, et al. Alterations in maternally perceived fetal movement and their association with late stillbirth: Findings from the Midland and North of England stillbirth case-control study. BMJ Open. 2018;8(7):1–9.

11. Rosenstein MG, Cheng YW, Snowden JM, Nicholson JM, Caughey AB. Risk of stillbirth and infant death stratified by gestational age. Obstet Gynecol. 2012 Jul;120(1):76-82. doi: 10.1097/AOG.0b013e31825bd286. PMID: 22914394; PMCID: PMC3719843.

12. National Institute for Health and Care Excellence. Antenatal care. Fetal movement monitoring. NICE guideline NG201. Evidence reviews underpinning recommendations 1.2.36 to 1.2.37 and 1.3.12. August 2021 https://www.nice.org.uk/guidance/ng201/evidence/p-fetal-movement-monitoring-pdf-331305934363